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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/798,710	03/10/2004	Michael E. Yoder	200314971-1	6166

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EXAMINER

BRADLEY, MATTHEW A

ART UNIT	PAPER NUMBER
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2187

DATE MAILED: 10/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/798,710	<b>Applicant(s)</b> YODER, MICHAEL E.	
	<b>Examiner</b> Matthew Bradley	<b>Art Unit</b> 2187	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 10 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 March 2004 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>3/10/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

The information disclosure statement (IDS) submitted on 10 March 2004 was filed on the mailing date for application 10/798,710. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the Examiner is considering the information disclosure statement with a signed and initialed copy being attached hereto.

### ***Claim Status***

Claims 1-22 remain pending, of which 4 are independent claims and 18 are dependent claims, all of which are ready for examination.

### ***Specification***

The disclosure is objected to because of the following informalities:

- Page 2 line 14 – a closed parenthetical mark appears with no apparent opening mark.
- Page 7 line 32 – the phrase “VM fault handler” appears.

Appropriate correction is required.

### ***Claim Objections***

Claim 7 is objected to because of the following informalities:

- Claim 7 line 2 – the phrase “is is” appears.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims **1-10** and **22** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

As per claims **1-10**, these claims fail to produce a tangible result. The method as claimed in independent claim **1** is merely a determination, which is nothing more than a thought or computation within a processor, preceded by necessary information to perform the determination. The determination is not a physical step that in turn produces a physical and tangible result, but rather an abstract step failing to provide a tangible result. Therefore, claims 1-10 are directed to non-statutory subject matter.

As per independent claim **22**, the instant language recites an operating system in the preamble, which is no more than a software system, pre se, thus lacking the hardware necessary to realize the underlying functionality. Therefore, claim 22 is directed to non-statutory subject matter.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims **1-4**, **7-14**, **19**, and **21-22** are rejected under 35 U.S.C. 102(a) and 35 U.S.C. 102 (e) as being anticipated by Koenen (U.S. 2004/0019891), hereinafter referred to as Koenen.

As per independent claim 1, Koenen teaches,

- providing a data structure including sets of equidistant localities; and  
(Paragraph 0026)
- determining a preferred locality using a pointer to a locality within said data structure (Paragraph 0051).

As per dependent claim 2, Koenen teaches, receiving an initial locality request including an indication of a search policy; and forming the data structure using physical memory localities within the system and using the search policy (Paragraph 0047).

As per dependent claim 3, Koenen teaches, wherein the physical memory localities include local memories at cells in the system (Paragraph 0051).

As per dependent claim 4, Koenen teaches, wherein the search policy comprises a "closest first" policy (Paragraph 0048).

As per dependent claim 7, Koenen teaches, wherein the determination of the preferred locality is performed using a get "best"/"next best" iteration procedure (Paragraphs 0025-0026).

As per dependent claim 8, Koenen teaches, wherein the pointer is rotated amongst localities within a current equidistant set so as to provide for round-robin type selection amongst those equidistant localities (Paragraph 0038).

As per dependent claim 9, Koenen teaches, wherein the determination of the preferred locality includes changing to a next equidistant set if there is no memory available in any locality of a current equidistant set (Paragraph 0037 as shown in the description preceding with reference to paragraphs 0033-0036).

As per dependent claim **10**, Koenen teaches, further comprising returning an indication that no locality is available if no locality within any of the equidistant sets has sufficient memory (Paragraph 0052).

As per independent claim **11**, Koenen teaches,

- multiple symmetric multiprocessing (SMP) nodes; (Figure 1 as described in Paragraphs 0019-0021)
- multiple central processing units (CPUs) at each SMP node; (Figure 1, items 12A-12C for example, as described in Paragraphs 0019-0021)
- a memory control unit at each SMP node which is coupled to each CPU at that SMP node; (Figure 1, items 12I, 14I, and 16I as described in Paragraphs 0019-0021)
- shared memory at each SMP node which is accessible by way of the memory control unit at that SMP node; (Figure 1, items 12H, 14H, 16H, as described in Paragraphs 0019-0021)
- a switching system coupled to the memory control units so as to interconnect the multiple SMP nodes; (Figure 1, item 18 as described in Paragraphs 0019-0021)
- an operating system running on the CPUs; (Paragraph 0027, taught as 'the O/S')
- a virtual memory (VM) fault handler within the operating system; and (Paragraph 0047)
- a VM locality module within the operating system; and (Paragraph 0037)

- a data structure of physical memory localities, wherein the VM locality module determines a preferred locality using a pointer to a locality within the data structure (Paragraph 0026 as shown in Table 2 directly beneath the paragraph).

As per dependent claim **12**, Koenen teaches, wherein the data structure comprises sets of equidistant localities (Paragraph 0048).

As per dependent claim **13**, Koenen teaches, wherein the preferred locality is determined using a "closest first" search policy (Paragraph 0048).

As per dependent claim **14**, Koenen teaches, wherein the data structure comprises a first set including a closest local memory locality and one or more other sets of equidistant localities (Paragraph 0048 and 0051).

As per independent claim **19**, Koenen teaches, A data structure for use in selecting a physical memory locality in a multiprocessor system, the data structure being configured in accordance with a search policy and comprising multiple sets of equidistant physical memory localities under the search policy (Paragraph 0026 as shown in Table 2 directly beneath the paragraph).

As per dependent claim **21**, Koenen teaches, wherein the search policy comprises an "closest first" policy, and wherein a first set comprises a most rapidly accessible memory locality (Paragraph 0048 and 0051).

As per independent claim **22**, Koenen teaches,

- a virtual memory manager configured for extending a memory space beyond limits of a physical address space; (Paragraph 0027)

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- a virtual memory locality module configured to rapidly select a physical memory locality in the system; and (Paragraph 0037).
- a virtual memory fault handler configured to interrupt execution of the virtual memory manager when a page fault occurs and to utilize the virtual memory locality module to determine the physical memory locality from which to allocate memory in response to the page fault (Paragraph 0047).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims **5-6, 15-18, and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Koenen and in view of Horstmann et al (U.S. 6,125,433), hereinafter referred to as Horstmann. (The Microsoft Computer Dictionary Fifth Edition is used as evidentiary support).

As per dependent claim **5**, Koenen teach the limitations as noted supra.

Koenen does not explicitly teach, wherein the physical memory localities further includes interleaved memory in the system.

Horstmann teaches, wherein the physical memory localities further includes interleaved memory in the system (Column 1 lines 57-67).

Koenen and Horstmann are analogous art because they are from the same field of endeavor namely, memory allocation.



At the time of invention, it would have been obvious to one of ordinary skill in the art, having both the teachings of Koenen and Horstmann before him/her to combine the interleaved allocation of Horstmann with Koenen for the benefit of reducing wait states and using available memory efficiently.

The suggestion for doing so would have been that, provides an efficient use of main memory. For example, a process's main memory allocation need not be contiguous; processes in main memory can be interleaved (Column 1 lines 61-64 of Horstmann). Further, in the Microsoft Computer Dictionary, interleaved memory is defined as a method of organizing addresses in RAM memory in order to reduce wait states. Given this ordinary definition, with Koenen and Horstmann, it would have been obvious to implement interleaved memory into Koenen to further improve the allocation methods of Koenen.

Therefore, it would have been obvious to combine Koenen with Horstmann for the benefit of interleaved memory to obtain the invention as specified in claims 5-6, 15-18, and 20.

As per dependent claims **5**, **15-16**, and **18**, the combination of Koenen with Horstmann teach, wherein the physical memory localities further includes interleaved memory in the system (Column 1 lines 61-64 of Horstmann).

As per dependent claim **6**, **17**, and **20**, the combination of Koenen with Horstmann teach, wherein the search policy comprises an "interleaved first" type of policy (Column 1 lines 61-64 of Horstmann with Paragraph 0025 of Koenen). *The Examiner notes that the benefit given to interleaved memory present in the system of*

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*Koenen, would anticipate the instant claim as the system of Koenon would first search interleaved memory on the system making the request to not only reduce wait states as mentioned supra, but further reduce latency thus optimizing system performance. Accordingly, the system created with the combination of Koenen and Horstmann anticipates the instant claim.*

### **Conclusion**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

1. U.S. 2004/0064655 Paulraj teach a memory allocation system.
2. U.S. 6,505,286 Kingsbury et al teach a memory allocation routine for NUMA systems.
3. U.S. 6,023,281 Grigor et al teach a memory allocation system based on proximity.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew Bradley whose telephone number is (571) 272-8575. The examiner can normally be reached on 6:30-3:00 M-F.

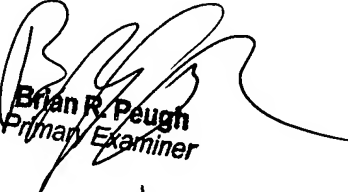
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald A. Sparks can be reached on (571) 272-4201. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Brian R. Peugh  
Primary Examiner  
10/2/06